THE DENTAL PRACTITIONER

a monthly journal for the Practitioner and his Staff

VOL. II, NO. 6 FEBRUARY, 1952

Incorporating the Official Supplement of
The Dental Laboratories Section of the Surgical Instrument Manufacturers' Association

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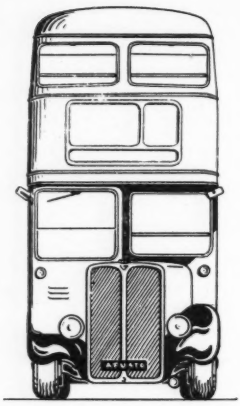

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THE DENTAL PRACTITIONER

A Monthly Journal for the Practitioner and his Staff

(Incorporating the Proceedings of the British Society of Periodontology and the Official Supplement of the S.I.M.A.—Dental Laboratories Section)

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THE DENTAL PRACTITIONER

A Monthly Journal for the Practitioner and his Staff

Vol. II, No. 6 February, 1952

EDITORIAL

REQUESTS

THIS number of the DENTAL PRACTITIONER contains articles written at your request, and we trust that they will be read and enjoyed by you all. The editorial committee would like to take this opportunity of thanking the authors for co-operating so willingly and so well, and at the same time remind our readers that being desirous of giving you, in this Journal, precisely what you want, we do welcome your letters and suggestions and will always do our utmost to gratify your wishes. So why not drop us a line ?

In the very near future we shall be starting a new series of "tear-out" charts "For Your Patient's Instruction". This series will deal with radiographs and we hope to be able to give you some excellent examples of each and every type of condition visible on an X-ray film. We trust that this innovation will prove both popular and useful.

THE CHANCELLOR

Mr. R. A. Butler (Chancellor of the Exchequer), making a statement in the Commons on the economic situation, referred to the Dental Service of the country. It had done excellent work, though it was by common agreement now in an unbalanced state.

"There are far too few dentists", he said, "and the attractions of the general service have led to the depletion of the local and school services. Dental work is not being done where it is most needed. At present in the school service, taken as a whole, there is only about one dentist to every eight thousand children. This is a shocking condition. We must get supply and demand into balance and make sure that those who need help most get preference." With that in mind it had been decided to impose a charge of one pound, or the full cost if less, for all treatment except dentures, where a charge is already made, but the new charge would not apply to children or nursing or expectant mothers. That should free more dental time for local and school services.

That would bring in some seven and a half million pounds. The Minister of Health would give fuller details of the new schemes in due course. As legislation would be required there would be ample opportunity to debate the undoubted merit of the proposals.

ILLUSTRATED HINTS

It would appear that you have all "run dry" of these hints, and as we cannot quite believe this, once again we remind you that we are anxious to receive that "wrinkle" of yours and are quite happy to do any necessary diagrams, etc., for you. Thus being no artist is no excuse ! Help us to help yourselves.

AN OUTLINE OF CLINICAL PARODONTICS

By **S. F. FISH**, L.D.S. R.C.S. Eng.

THE paper of which the following is an adaptation was originally presented at a meeting of the London Hospital Dental School Demonstrators' Study Circle, the intention being not to claim originality, but to give to colleagues in the other departments of the School some information on the teaching in the Parodontal Clinic. It is now published in the hope that it may be of more general interest.

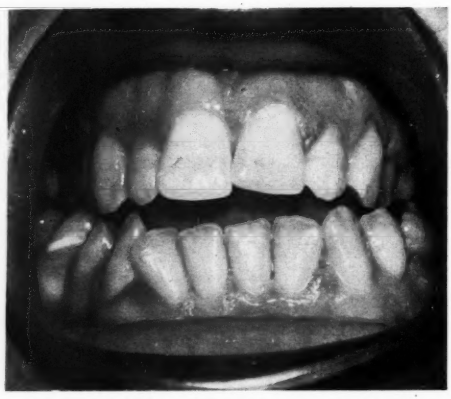

Fig. 1.—Gingival inflammation at the site of imbrication $\overline{32|}$.

THE DENTIST'S RESPONSIBILITY

The concern of the dentist as parodontist is with the supporting structures of the teeth, the diagnosis and treatment of their specific ills, and such steps as are necessary for their maintenance in good health. It is emphasized to students that a large proportion of extractions are necessitated by neglected parodontal disease. It is easy, all too easy, to demonstrate neglect on the part of the patient, but the dentist must ensure that no neglect of his contributes to the final catastrophe of clearance. Thus, in the examination of all patients —and particularly in dealing with young patients—the evil potentialities of minor defects in the parodontium (such as detachment of the interdental papillæ in the molar region, or local gingival inflammation at the site of imbricated teeth—*Fig.* 1) must be realized, and their importance as precursors of pocketing severe enough to necessitate the extraction of the teeth. Further, every one of the operations that the dentist performs has some sort of influence on the health of the supporting tissues of the teeth. In conservative work, in prosthetics, in orthodontics, in exodontia, it must be ensured that the restricted aim is achieved without direct or consequential damage to the supporting tissues.

As a corollary to the view that a minor localized gingivitis may be the early stage of a gross parodontal lesion, it follows that instruction in preventive measures plays a large part in the work of the Parodontal Clinic. It is hardly necessary to mention that the work of prevention is always much less dramatic and much harder to explain than final radical measures, and demands from both patient and dentist a more robust faith and confidence. In this work, the drastic and bloody prospect of complete gingivectomy—which seems to be the first association in the student's mind when he comes to the Parodontal Clinic—has to give place to a conception of himself as employing every device of treatment and instruction to remove the necessity of doing this operation. And the most potent charm to his hand is scaling.

The insistence on the importance of scaling and the importance of doing it thoroughly are somewhat abhorrent to the student, one reason being that learning to exert the controlled power of fingers and thumb necessary to remove subgingival calculus effectively and safely is one of the most difficult tasks that the tyro dentist has to face. Scaling is not primarily a cosmetic measure, but a therapeutic aid of the greatest value.

Calculus, and most emphatically, subgingival calculus, is to be regarded as a most villainous evil and its removal as the first step in almost every case requiring parodontal treatment. It is the first step because it is necessary to clean

the field of operation, and because by the removal of calculus the gingivæ are relieved of a source of continual irritation and infection. Only when it is removed, and the associated inflammation has subsided, can the true relationship of teeth and gingivæ be decided and the incidence of other pathological factors be assessed (*Fig.* 2). The extent and location of pocketing, for instance, is strikingly varied when subgingival calculus is removed, and the correct relative significance to be given to traumatogenic occlusion or faulty restorations more clearly shown. Moreover, if a gingivectomy has to be performed, the tissues are the healthier to stand the unavoidable trauma—quite apart from the fact that gingivectomy knives do not wear well when used as involuntary scaling instruments. Finally, it is useless to attempt to teach the patient how to care for his gums if every one of the unnatural movements that we expect him to make results in inflamed or healing tissue being rubbed against the *chevaux de frise* of calculus.

CO-OPERATION OF THE PATIENT

The personal care of the gums carried out by the patient is an essential complement to the operative measures, and the power to impress the patient with belief in success and terror of your displeasure in failure is almost as important as skill in diagnosis and treatment. It can certainly be said that a judgement of the patient's enthusiasm is an important part of prognosis.

The desired effect is twofold: first, adequate cleansing; second, stimulus to keratinization of the oral epithelium. Fortunately, the response of keratinization on the part of the epithelium when subjected to graduated friction can be very easily demonstrated by reference to the skin of the hand and foot. It is easy, also, to show how lacking in detergent material is the standard diet of Western civilization. What is harder is to offer acceptable suggestions for a modification of that diet to suit the need of the dental apparatus. Given a diet so poor in stimulating matter as ours, it is no wonder that the gingival epithelium becomes poorly keratinized, and, as a consequence, subject to injury.

THE GINGIVAL ATTACHMENT

A superficial injury, away from the gum margin, is of little consequence, for the normal processes of infiltration, granulation, and epithelialization take place without trouble. Near the gingival margin, on the other hand, the matter is very different, for there is found the junction between teeth and epithelium, between hard and soft tissues, which has characteristics and susceptibilities quite its own.

The normal gingival sulcus is formed by a limited separation between the tooth and the

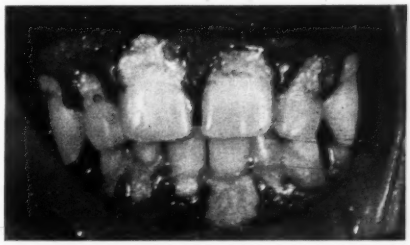

Fig. 2.—Marginal gingivitis—gross deposition of calculus and food debris.

epithelial attachment, and is about 1 mm. in depth. Deep to the marginal epithelium are fibrous connective tissue and the superficial fibres of the periodontal membrane. Still deeper is the ligamentum circulare.

An injury at the gingival margin is likely to be repeated at intervals. It is also subject to constant re-infection, and subgingival calculus is quickly formed. In these circumstances a tiny ulcer develops and becomes chronic. The resulting œdema causes a relative deepening of the sulcus, and food debris—a most acceptable pabulum for bacterial growth—accumulates. The collagen fibres of the connective tissue of the gingivæ are destroyed by toxic products of bacterial metabolism, and the margin becomes flabby and swollen. (Hyaluronidase is a toxic metabolite of this type, and Aisenberg and Aisenberg (1951) publish a brief preliminary report of work on this.)

This condition is described clinically as a marginal gingivitis, subacute or chronic according to history and appearances. In the subacute form, the gum margins are bright

red, œdematous and bleed easily, the interdental papillæ are swollen and overfill the interdental spaces, with food debris between the detached papillæ and the teeth. In the chronic form, which may exhibit phases of a relatively acute nature, the gums are duller in shade, firmer in texture, and do not bleed so easily. Both the forms are found in young people, and the finding of one form or the other seems to have some association with the bodily habit of the patient. The chronic form seems to be found in the "tougher" types, and one gets the impression that the adjective may be practical as well as metaphorical—that the tissues of such an individual do seem to offer greater resistance to destruction than those of persons of lighter build and more fragile appearance. A more acute marginal gingivitis is sometimes seen in young females at or about the time of puberty, which suggests an underlying endocrine factor.

PYORRHŒA

If left untreated, a marginal gingivitis may persist for many years without gross deterioration, but, sooner or later, it enters a phase of progressive destruction. Weakening of the connective tissue fibres and loss of bone from the alveolar crest leads to deepening of the sulcus to form a parodontal disease. Fresh ulcers develop in the depths of the sulcus, now deepened to form a pocket, and so the process goes on. As the sulcus deepens, and the extent of the detachment increases, bleeding is not so easily caused, for the ulcers are less accessible to interference. On the other hand, blood wells up at the slightest touch of an instrument in its depths, and pus may be expressed. Incidentally, it is important to impress upon the student that a parodontal pocket has definite bounds that can be traced with an instrument handled with due care, and that they must be so traced and identified if the scaling is to be complete and the necessary information gained.

Once again, it seems that the general constitution of the patient has a relation to the way in which the pyorrhœa may develop. The case showing a chronic marginal gingivitis usually presents later, if untreated, with a pyorrhœa simplex, in which there is a more or less constant deepening of the sulci throughout the mouth, the disease progressing slowly and steadily. As a general rule, on the other hand, the subacute marginal gingivitis will be followed by a pyorrhœa profunda, which has a more rapid development, and which is characterized by the appearance at various points of very much deeper and narrower pockets, such points sometimes being associated with a history of pain and tenderness and swelling of short duration. This classification into pyorrhœa simplex and pyorrhœa profunda is taken from the work of Dr. Wilfred Fish (1946), to which the writer must acknowledge his indebtedness.

These excessively deep pockets are the sites of old parodontal abscesses which result from the transference of viable organisms from the surface of the ulcers into the deeper tissues and their proliferation there. Normally organisms in the blood-stream or tissues are destroyed very quickly. In certain circumstances, however, they may proliferate and cause a violent reaction, it being necessary that they find a site where they are protected from attack by the leucocytes. Such a site may be provided in the circumstances now being considered, if the trauma is severe enough to thrust a mass of debris into the deeper tissues. In a parodontal pocket this may happen on a very small scale, and the small abscesses resulting would be a means whereby pyorrhœa profunda progresses so rapidly.

The formation of such abscesses would do much to explain, also, the rapid destruction wrought by excessive masticatory strain, by ill-fitting dentures, and by badly finished interstitial fillings. Teeth subject to excessive masticatory strain become loose and may provide a site for bacterial growth by damage to a lymphatic in the periodontal membrane just at the moment when use of the tooth has precipitated organisms into the deeper tissues. So may a badly fitting denture in a similar way.

The consideration of the progression from marginal gingivitis to pyorrhœa shows gingivitis to be of some importance. Its early recognition and a knowledge of treatment are very important duties of the dentist in general practice.

PRACTICAL MEASURES

The first step is to clean the affected tissues, scaling being carried out gently but thoroughly. The patient must be taught to maintain cleanliness and to encourage keratinization. Correct use of the toothbrush and the use of woodpoints are the principal means. The use of the toothbrush must be fully explained to the patient, who must be seen several times, brush and point in hand, to ensure that the lesson has been learnt. A soft brush, correctly handled, is of much more use to the sufferer from marginal gingivitis than applications, collutoria, and the like. The great task is to get the patient to believe it. The Charters-White method, in which the aim is to get the bristles as deeply as possible into the interdental spaces, and into the spaces between the detached interdental papillæ and the teeth, is very effective. It is, however, uphill work convincing the patient that it is worth the bother—and a notable bother it is, as any who have tried it will agree. Further, since the average time assumed to be adequate for cleaning a full mouth is about two minutes, it takes great strength of mind to remain on the job for about a quarter of an hour. But—the fact is not to be avoided—if the patient wishes to safeguard his teeth he must take some trouble, and the fact that he has had a gingivitis is a warning that he will get it again.

Wood points are a most valuable adjunct to the toothbrush, being inserted between the teeth and used with a fiddling motion to exert friction and pressure on the interdental tissues not normally reached by the toothbrush. Each individual patient has to be coached in the appreciation of the ends desired, and much ingenuity must be used to devise special measures for the special circumstances of each mouth. The gums will tolerate a soft toothbrush and soft wood points very soon after an attack of gingivitis, but neglect by the dentist to ensure that soft ones are used will merely lead to the home treatment being abandoned.

In some cases follow-up inspection will show that the home care has been successful and that the interdental papillæ have shrunk, and that the crevices are being kept clean and healthy. In others, these papillæ remain so large and loose that they get in the way and are repeatedly injured. This may become apparent only when the healing has progressed and the patient goes on to a harder instrument more vigorously used. Such papillæ should be excised, a modified gingivectomy being done.

The simple measures detailed above are applicable with little modification to cases of mild chronic marginal gingivitis, in which the destructive process is slow. In the subacute type, the patient gives a history of more abrupt onset, and hæmorrhage from the gum margins is a more prominent feature of the history. On examination, it is seen that the gingivæ have a narrow, well-defined, inflamed margin, bleeding is induced at a touch, and the whole of each interdental papilla is inflamed and œdematous. This condition is often found in mouths that are reasonably well cared for, and little subgingival calculus is present. The significance of this is that the breakdown has been rapid, and that only meticulous care on the part of the patient will preserve the teeth. The first step is once again a most careful scaling, but it is usually necessary to follow this with an early gingivectomy. This is done to ensure that there is no delay in giving the patient access to the epithelium right up to its junction with the teeth so that the special measures of graduated friction may be applied and keratinization encouraged.

COMPLICATING FACTORS

In very many cases, a marginal gingivitis presents complicated by other factors. One very frequently seen is food impaction, of which the possible causes are many. There may be a gross carious cavity, there may be a most recondite interstitial caries, there may be a slightly displaced lower second premolar of which the cusp is acting as a plunger into the upper interdental space, the upper premolar may be drifting backwards, deprived of the companionship of the first molar, the whole occlusion may be grossly disorganized, or the patient may be wearing a one-tooth denture having a so sharp extension into the interdental space and creating a noisome *oubliette*.

The remedies for these particular conditions are obvious—fill the cavity, search for the

hidden caries and restore the contact point, stone down the lower premolar, restore the contact on the drifting upper premolar and buttress it distally, make a denture without interdental extensions or a bridge.

In the younger patient, that is to say, up to early adulthood, it will still be possible to correct these complications and, having done so, to restore the gingivæ to a condition in which the patient can maintain them in health. But it will be noticed that this short list involves three principal specialized branches of dentistry: conservative, prosthetic, and orthodontic.

Fig. 3.—Two views of plastic splint after gingivectomy.

It is indeed the case that the supporting tissues function as the common reflector of every operative measure of dentistry, and the parodontist, paying due regard to this, will find that many of his problems will be capable of solution only by recourse to specialists in other branches. Conversely, whatever is done by hygienist, prosthetist, conservative worker, or orthodontist, has or will have a reaction on the parodontal tissues. The prognosis of each individual tooth operated upon or utilized depends, in the last instance, on the present or future state of these tissues, and the justification of any procedure rests upon its having a negligible or beneficial effect upon them. Their health is the criterion for or sets the limit upon orthodontic procedures, it condemns or approves a denture, reacts immediately and adversely to a badly executed filling, and is a controlling factor in the decision whether or not to do a root therapy. The work of the parodontist is indeed a nexus of dentistry.

In the older patient, while the above considerations apply, the problems are rather different. Generalized parodontitis will take the form of pyorrhœa, accompanied by more or less severe pocketing and destruction of the alveolar bone as well as of the periodontal membrane. The destruction of the bone is a result of the poisoning of the osteocytes by toxic matter seeping down from the ulcers and contaminating the tissue fluid. (Very mild and very chronic intoxication of this type will bring about sclerosis.) The amount of bony support remaining may be very small and the teeth may be very loose, but the one feature does not vary directly as the other. The excessively long clinical crown resulting from the destruction of the bony attachment constitutes a problem in itself, for the teeth must be given some support if they are to be preserved. An acrylic splint is of great value at the time of operation and will conveniently serve as an applicator for whatever type of pack is used after the gingivectomy (*Fig.* 3). Later, a more permanent appliance embodying the same principle, i.e., to give support, may be cast in metal. Before making the permanent appliance, which can carry replacements for missing teeth, careful stoning of the occlusal surfaces and incisive edges will reduce the excessive length of the clinical crowns, and should serve also to rectify traumatogenic occlusion.

TRAUMATOGENIC OCCLUSION

Traumatogenic occlusion may present either as a result of congenital deformity, or as a consequence of mutilation by extraction. In the younger patient, it may be necessary to call in the aid of the orthodontist. With the older patient, adjustment of the occlusal surfaces and their restoration by means of prostheses of various types must be resorted to. But, in every case, the rehabilitation must be planned by means of bite records transferred to a fully adjustable articulator.

The aetiological significance of traumatogenic occlusion varies greatly from one patient to another. Two cases may be quoted to illustrate this. The first was a man of 45 years, lean and wiry, and of unusually muscular habit. The lower arch was complete, but the molars were deficient in the upper. The lower incisors were biting with such force on to the palatal surfaces of the upper incisors that the enamel was completely stripped from these surfaces, and the upper incisors were reduced to sharp-edged wedges. There was, however, not the least sign of breakdown of the supporting tissues. The second case was a girl of 17. Both arches were complete (except for the third molars) and regular, and the only apparent abnormality in the occlusion was the retention in the arch of the lower right deciduous canine. Associated with this was the expansion of the lower anterior arch. The retained deciduous canine was mesial to the permanent canine and impinged on the distal corner of the upper right lateral, which corner was rotated slightly labially. At the labial gingival margin of the lateral, slightly distal, was an epuloid growth, deep red in colour, sessile, 4 mm. in diameter, and underlaid by a pocket of corresponding depth. The hyperplasic tissue was excised, after the very small amount of calculus present had been removed. Within two weeks the growth had recurred but, with no further treatment than the relieving of the excessive occlusal impact from the deciduous canine, it disappeared within ten days.

Thus, in the one case, there was gross traumatogenic occlusion without any parodontal involvement; in the other, a minor degree of occlusal trauma appeared to be the sole significant aetiological factor. In the majority of cases in which occlusal trauma is suspected it is more difficult to demonstrate its significance, but it should be sought for along with the other local factors mentioned.

ACUTE ULCERATIVE GINGIVITIS

Another frequent complication is an acute ulcerative gingivitis, a Vincent's ulceration

Fig. 4.—Acute ulcerative gingivitis, showing accumulation of debris, large ulcer ($\underline{|34}$), and destruction of interdental papillæ ($\underline{321|12}$).

(*Fig.* 4.) That is the true nature of this condition—as a complication of a pre-existing non-specific gingivitis—and the answer to the problem of preventing a recurrence is to search for and eliminate the factors that brought on the chronic or subacute gingivitis, a gingivitis not left as a residuum after the acute infection, but which represents the *status quo ante*. From this it follows that the attack on acute ulcerative gingivitis with the familiar chromic acid and the ever handy *Troch. Penicill.* will be a delusion if this form of treatment is regarded as anything more than a means of obtaining a breathing space from acute symptoms in order that remedial treatment may be carried out. With this limited objective these drugs are extremely valuable, but the dangers of both must be remembered—of chromic acid and hydrogen peroxide, that they will neatly remove the superficial layers of gum epithelium over a wide area if given the opportunity; and of penicillin, that its use clears the field for the resistant mutants that are present in any mixed infection.

A very bad ulcerative gingivitis will be very tender—too tender for the patient's tongue to touch—and that leads to the accumulation of debris that does so much to make these cases so foul. The first step is to clean up a little with the aid of gentle syringing and atomizing and wiping with cotton-wool. This can be done without causing the patient acute agony. Chromic acid and hydrogen peroxide can then be laid around the gingival margins with the aid of finely pointed college tweezers. Twenty-four hours later the patient will be found to be very much more comfortable and so far relieved as to permit further cleansing with instruments.

Fig. 5.—Gingivitis (especially marked in $\underline{3}$) associated with very vigorous use of hard toothbrush.

A third visit will follow the same plan, but at the fourth it should be possible to go far towards completing the scaling, and the chromic acid should be stopped. The patient will now possibly be able to start cleaning the gums with a soft brush, but they are often too painful still, and a few days' interval between treatments will bring about a recurrence of the ulceration at one or more points. A most valuable resource at this stage is the use of some sort of pack, such as zinc oxide, oil of cloves, and cotton-wool. The packing material is placed over the ulcerated gingivæ and left for a week, an intermediate appointment being made for inspection. The protection thus afforded has a salutary effect; the patient is at once made comfortable, and removal of the packs shows the ulcers to have responded to the protection by healing and epithelialization.

The acute stage over, and oral hygiene established, the mouth must be examined for parodontal pockets, and for any area where a nidus may shelter. It will now be seen what tissue has been destroyed by the ulceration, and the partial gingivectomy thus performed by nature completed and tidied up. Danger spots, which, if left untreated, will originate another outbreak, are just those for which one looks in a case of marginal gingivitis, and, more particularly in a case of acute ulcerative gingivitis, imperfectly erupted lower wisdom teeth. In many cases the infection can be eradicated from all parts of the mouth save one spot, and lingers there until the defect has been rectified and the area made accessible for cleaning. Though the infecting organism needs shelter, it becomes a clinical entity when attacking superficial tissues, and the site of election in a mild case is the tips of the interdental papillæ, the flattening or excavation of which may be the most significant finding.

Fig. 6.—Hyperplasic gingivitis associated with mouth-breathing.

INFLAMMATION OF SPECIFIC ORIGIN

There are several inflammatory conditions of the gingivæ which are not uncommon and which may be said to present specific features. An anterior gingivitis, usually hyperplasic, and especially when found in a child, is strongly suggestive of mouth-breathing. Reference to an aural surgeon may be necessary to ensure that the nasal route is clear, and an oral screen

will be found to be of value in re-establishing nasal breathing. Instruction in oral hygiene is essential. (*Figs.* 6, 7.)

Epanutin hypertrophy, found in epileptics who are receiving regular doses of this drug, is characterized by gross enlargement of the gingivæ. In most cases the epithelium appears to be normal and the enlargement due to a great increase in the fibrous elements. It recurs after excision, though some success is reported in preventing recurrence by means of X-ray therapy (Stammers and Bromley, 1949).

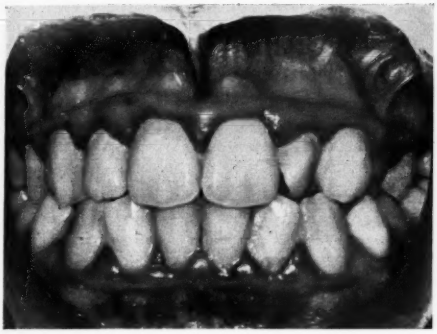

Fig. 7.—Same case as *Fig.* 6 one week after instruction in use of toothbrush. Some improvement is seen, but patient needs re-instruction and encouragement.

Gingivitis of pregnancy is an inflammatory hypertrophy which may be accompanied by persistent hæmorrhage. Localized exaggerations of the condition may occur simulating neoplasms, and are usually found to mark the sites of such defects as ill-fitting crowns, badly finished fillings, or stagnation areas (*Fig.* 8).

The condition can be very alarming and distasteful to the patient, by reason of the discomfort and the frequent hæmorrhages. Immediate improvement is seen when delivery has taken place. Atomizing and the use of astringents will do much to relieve the condition, but it is evidence of a pre-existing parodontitis, and it may be necessary to do a radical gingivectomy actually during the pregnancy. After the delivery, if radical treatment has not been completed, routine parodontal treatment must be given.

Mention must also be made of the ulcerative gingivitis associated with the acute leukæmias (monocytic and myelogenous). Ulcerative and necrotic lesions are marked features of the oral manifestations, accompanied by a slow and continuous hæmorrhage. The diagnosis can be established only by a blood-count.

SUMMARY

In this paper no attempt has been made to treat the subject of parodontal disease exhaustively. It has been sought to present an outline of the principles upon which teaching is based. Emphasis has been placed upon local factors, and upon the preservation and restoration of the masticatory apparatus. The systemic effects, however, though conjectural, must not be overlooked, and at least it can be said with certainty that the eradication of parodontal disease removes one undesirable strain on the general protective mechanisms of the body.

Fig. 8.—Gingivitis of pregnancy; gross hyperplasia at $\underline{654}|$ associated with carious cavity in $\underline{4}|$ and calculus around $\underline{6}|$.

Acknowledgements are due to Mr. Broadbury, of the London Hospital Photographic Department, for the care and skill he exercised in preparing the illustrations.

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THE REMOVAL OF RETAINED ROOTS*

By **D. M. MACDONALD**, F.R.C.S. Edin., F.R.F.P.S., L.D.S.

In order to establish the incidence of retained roots in a cross-section of the adult population an investigation was undertaken on 6000 patients referred for extraction of teeth under local anæsthetic. The incidence was found to be 31·5 per cent. It may be inferred, therefore, that the removal of retained roots is, or ought to be, one of the more common oral surgical procedures.

It has been claimed that some roots may be left in situ without subjective or objective symptoms. The pathological changes which may occur around a remnant of root, however, make the retention of such roots an undesirable practice.

The retention of roots occurs as an extension of caries of the teeth with subsequent loss of the crowns, or as a result of trauma, or as a combination of injury and disease. Although the incidence can be reduced by careful selection of cases for surgical extraction, no dental surgeon can avoid occasionally fracturing roots during extractions. It is pertinent to consider therefore, some of the reasons for root retention, the technique of root removal, and the means by which the incidence may be reduced.

The reasons for retention of roots are mostly mechanical and consist of:—

1. Tooth anomalies, e.g., fusion, curvature, and divergence of the roots.
2. Pathological processes, e.g., false geminations, hypercementosis, osteosclerosis, and ankylosis.
3. Faulty technique in the extraction of teeth.

* A paper read before the North Hertfordshire Section of the British Dental Association, April, 1951.

ANATOMY

In order to appreciate more fully the mechanical reasons, it is necessary to consider briefly the various root formations and the bone in which they are embedded.

Maxillary Incisors.—The root of the central incisor is the least liable to abnormality of root formation, and it is nearly always straight and cone-shaped, with a bluntly rounded apex. The lateral incisor, however, varies in form more than any other tooth in the mouth except, perhaps, the maxillary third molar.

Table I.—Percentage Incidence of Retained Roots in Upper and Lower Jaws

Percentage	2·2	4·0	4·8	3·3	5·2	3·7	3·2	1·7	1·2	2·2	4·0	5·6	2·6	4·8	3·2	2·5
Upper jaw ..	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Lower jaw ..	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Percentage	4·0	3·9	5·1	3·3	3·2	1·9	1·2	0·9	0·6	1·3	1·7	3·7	2·8	4·5	3·3	4·4

The root is usually a slender, tapered cone with an apex which is frequently bent distally or disto-lingually. Two roots are excessively rare. The cortical plate and the underlying cancellous bone of the alveolar process are much thicker palatally than labially. Ease of access, elasticity of the surrounding structures, and single conical roots make the incidence of retention of roots in the maxillary incisor region lower than in any other part of the mouth, with the exception of the mandibular incisors (*Table I*).

Maxillary Canine.—The root is the longest in the maxilla. It is conical in form and has a rounded apex. Not uncommonly, the apical third shows a sharp distal or labiodistal curvature. The buccal cortical plate is dense, with no underlying cancellous bone. Strength of alveolar process, length of root, and the possibility of apical curvatures make the incidence of root retention fairly high (*Table I*).

Maxillary Premolars.—Sixty per cent of first premolars are double-rooted and the remainder are generally bifurcated for half of their length and flattened mesiodistally. Occasionally

three roots are present. The roots may be tortuous, slender, or divergent, and a distal curvature of the apex is commonly seen. The incidence of retained roots of maxillary first premolars is higher than in any other part of the mouth (*Table I*).

In 15 per cent of cases the second premolar is double-rooted. Usually the root is flattened mesiodistally and lies in close relationship to the maxillary air-sinus.

Maxillary Molars.—These are the largest teeth in the arch and usually carry three roots, two slender buccal roots and a stouter palatal root, usually angulated from the others. Four-rooted molars are rarely seen. Variations in development from wide divergence to fusion of roots are common. In the molar region the palatal cortical plate is extremely thin to accommodate the posterior palatine canal, and there is little cancellous bone underlying it. Buccally, the supporting bone is somewhat thicker, but frequently the mesiobuccal root is lying uncovered by alveolar process. Occasionally the bone is very thick and dense owing to the proximity of the root of the zygomatic bone.

The third molar may present many abnormalities. Usually the roots are fused with multiple slender apices inclining distally, but they may show divergencies or complex curvatures.

Mandibular Incisors.—These roots show a lower incidence of retention than in any other part of the mouth. They are narrow mesiodistally and thin and the apical third is tapered, usually curving distally. Double roots are excessively rare. In the incisor region the alveolar process is very thin, the outer cortical plate being as heavy and thick as the inner, with little underlying cancellous bone.

Mandibular Canine.—This is similar to the maxillary canine, but is shorter in the root by one or two millimetres and is weaker in structure. Curvature of the apical third may occur, usually in a mesial direction. Not infrequently, the apical part divides into a buccal and a lingual root.

Mandibular Premolars.—The first premolar is usually a single-rooted tooth with a conical root tapering to a pointed apex. The root is flattened mesiodistally and occasionally a deep developmental groove ends in a bifurcation at the apical third. Three roots are excessively rare, two lying buccally and one lingually.

The second premolar is usually a single-rooted tooth. Occasionally it shows a groove buccally, but the root is very rarely bifurcated although apical curvatures are common.

The alveolar process is dense in the premolar region and shows little elasticity. These factors, combined with the proximity of the mental foramen, cause a high incidence of root retention in teeth, which many consider to be the most difficult to extract (*Table* 1).

Mandibular Molars.—Are usually double-rooted, but occasionally a third root is seen which lies on the lingual side of the distal root. The mesial root is broad and curved distally, the distal root is rounder, and also inclined distally. The point of bifurcation of the roots is 3 mm. below the cervical line. Wide variations in the root formation are frequently seen. The alveolar process is thin lingually, with a minimum of cancellous bone. Buccally, the bone is very dense and thick, being reinforced by the external oblique ridge. At the retromolar triangle, the cortical bone is thin but very dense, with abundant underlying cancellous bone. Hypercementosis is commoner in the mandibular molar region than in any other part of the mouth and is due to an irritative hyperplasia of the cementum following chronic inflammation of the parodontal tissues.

EXAMINATION OF THE PATIENT

After a careful subjective and objective examination of the patient, a good radiograph is essential in order to localize accurately the position of the root remnants in the jaw. If the root is present as a result of the extension of caries, localization is usually unnecessary as the gum never heals over a carious root. In the case of a fractured root, however, the bone of the alveolar process may envelop the root and the gum heals. If a chronic infection is present there may be evidence of a sinus leading to the root remnant.

Radiographic localization may be carried out quickly by injecting a few minims of local

anæsthetic into the gum at the suspected site of the root and then inserting a small pin or pins between the gum and alveolar process. An intra-oral radiograph, centred on the pin, is then taken (*Fig.* 1). Another method of localization in the edentulous jaw is by the use of a waxplate containing dissimilar wires (*Fig.* 2).

The principle of parallax, by which two objects apparently change place by being viewed from different points, may be applied radiographically in the anterior part of the mouth, to determine the depth of a root in the alveolar process. If the shadows of two objects

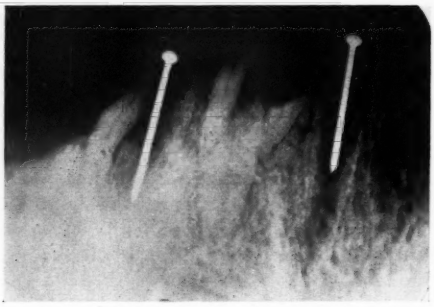

Fig. 1.—Radiograph showing localization of roots by pins.

Fig. 2.—Radiograph showing localization by means of dissimilar wires in a waxplate.

are seen in line in a radiograph, their relative positions may be determined by taking another radiograph with the central rays passing in another direction when the further of the two objects will be found to have moved apparently in the direction of the tube.

In the maxillary molar region an occlusal film may be necessary to demonstrate the buccal and lingual roots, as periapical radiographs are often obscured by superimposition of the roots and by the anatomy of the coronoid process and the zygomatic bone.

The operator should now possess an adequate history and a clear idea of the size, shape, and position of the retained root. Without these essentials unpleasant sequelæ occasionally occur. Conversely, adequate preparation, sound surgical technique, ability to deal with complications, and a sympathetic understanding of post-operative treatment, will be well worth the attention of the operator and will certainly benefit the patient.

TECHNIQUE

Cutting the Flap.—The first essential to sound surgical technique is adequate exposure. Ineffective digging for root remnants in a small, blood-filled hole, should be eschewed. A minimum of trauma is essential and to obtain good access to the root, a flap of mucoperiosteum should be raised from the alveolar process.

Certain principles are involved in raising flaps and these are:—

1. Use of a sharp scalpel. A No. 15 Swann-Morton blade, mounted on a No. 3 handle, is a convenient size and reaches the back of the mouth without cutting the lips, owing to the shortness of the cutting surface of the blade. A curved, pointed blade, the No. 12, is useful for cutting a flap distal to a molar where access is difficult.

2. Incise at a right angle to the mucosa and cut down on to the alveolar process with one stroke, to minimize trauma. As the scalpel blade incises on to bone it must be discarded at the completion of the operation.

3. The line of incision should be semicircular, with a wide base and without angles to ensure an adequate blood-supply entering and leaving the flap and so promoting healing by first intention. Avoid cutting large vessels and nerves.

4. Raise the mucoperiosteum in one piece and do not traumatize it when doing so.

5. Design the flap so that the margin lies on bone at the completion of the operation and not on a defect or dead space.

Removal of the Root.—The gingiva is immovably attached to the periosteum, which is itself firmly bound to the bone. A sharp elevator, such as the Howarth raspatory, is a useful instrument for raising the mucoperiosteum without trauma. It should be retracted and held under a gauze swab with a blunt retractor.

The bone of the alveolar process is then examined. In the case of a buried root or apex, a discoloured area or a breach in continuity of the alveolar process may be noted. With the aid of a gouge or chisel, or a bur in a dental engine, a window should be cut in the alveolar process and sufficient bone removed to expose fully the root. Force is not required to remove the root if the access is adequate. The cavity is now gently curetted until a hard and clean bony wall remains. Bone spicules are removed and sharp edges are rounded off with a bone-cutter or rongeur. The cavity is then irrigated with heated normal saline and the flap of mucoperiosteum replaced and sutured in position with interrupted No. 24 black linen thread on a curved, cutting needle. Do not tie the sutures tightly, but allow sufficient room for swelling of the tissues.

All roots should be removed at the time of extraction of the tooth. Very seldom is this not possible. If sufficient length of root remains after the crown has been removed, the case should be treated as an ordinary extraction. If one root is broken down or insufficient remains to grip with forceps and the other root is intact, apply forceps to the sound root and extract. One or both roots may be removed. In the case of a maxillary or mandibular molar where the crown has been removed and left undivided roots which cannot be gripped with forceps, the roots must be separated. This may be done by a bur, chisel, osteotome, or tooth-splitting forceps. The quickest and most effective method is by the use of forceps, which are insinuated between the alveolar process and the tooth, in the groove between the roots. Moderate force is required to split the tooth, after which the roots can be lifted out singly —in the case of an upper tooth with Ash Forceps No. 76 N. and in a lower tooth with No. 74 N. The tooth-splitting forceps which have been found most useful are Ash Forceps No. 72 (Rowney's) left and right for upper teeth and No. 91 (Rowney's) for lower teeth. Ash Root Elevators Nos. 21 and 22 (Hospital Pattern) are useful instruments for removing roots where an adjoining empty socket is available. The elevator is inserted into the socket and by turning it through a right angle the interseptal bone and the root can be removed.

When the crown of the tooth has been broken off level with the alveolar process, the application of a tooth-splitting forceps may be difficult owing to the thickness of the crest of the alveolar process, especially in the palatal aspect of maxillary molars and the buccal aspect of mandibular molars. This difficulty may be overcome by cutting a groove in the alveolar process with a bur in a dental engine sufficient to allow insinuation of the blade of the forceps between the alveolar process and the tooth.

When half of the root or the apex is retained, a small window should be cut in the outer plate of the alveolar process, exposing the root remnant. A sharp elevator is then insinuated under the fragment, which is removed. By this means the alveolar ridge remains intact and healing is hastened.

In elderly patients, where there is evidence of bone sclerosis, the use of a tooth-splitting forceps is contra-indicated and a bur in a dental engine should be used. In advancing years, especially in solitary teeth which have borne the strain of mastication for some time and where there is compensatory thickening and sclerosis of the alveolar process, special precautions are necessary to prevent fracture of the jaws.

Generally, the use of absorbable substances such as oxidized gauze or absorbable gelatin is contra-indicated for filling dead spaces or bone cavities because of the interference with normal healing. The processes of repair of tissue by organization of clot or by granulation, whether it be bone cavity or incised wound, require the presence of a sound blood-clot. The size of the clot, however, must be within certain limits as too large a clot

cannot be vascularized by young capillaries budding from the endothelial walls of the older vessels. In the presence of troublesome hæmorrhage or where there is insufficient bleeding to form a clot, the use of absorbable substances may be indicated.

OPERATIVE COMPLICATIONS

Hæmorrhage.—Is rare after root removal and usually signifies a blood dyscrasia, with an alteration in the bleeding or coagulation time. Excessive hæmorrhage may occur following removal of mandibular third molar roots which encroach on the inferior dental canal and artery or from the posterior palatine artery following instrumentation, or fracture of the tuberosity whilst removing a tooth or a root. Providing all the coats of the artery are completely severed, firm packing with gauze will control the hæmorrhage. The use of 1–1000 adrenaline pack, fibrin foam, human or bovine thrombin, gelatin sponge, alginate wool, hæmorrhage plates, etc., all serve useful purposes in the control of hæmorrhage.

Fig. 3.—Mandibular third molar displaced and inverted below the mylohyoid muscle.

Nerve Injury.—The inferior dental, lingual, or palatine nerves may be contused, compressed, or lacerated during operations on the mandibular, third molar, or palatine regions. Anæsthesia or paræsthesia of the lower lip, chin, tongue, or palate will follow. If the injury to the nerve is noticed at operation, it should be exposed and all signs of compression, as might occur from bone spicules or roots, removed. If the nerve is completely divided the ends should be approximated in their course without signs of compression. Recovery of sensation is usual in from six weeks to six months. After this time recovery is unlikely.

Displacement of Root.—Injudicious instrumentation may displace a root from its site in the alveolar process to a site more difficult of access, e.g., the root of the mandibular third molar may be pushed through the thin lingual plate of the alveolar process where it might come to lie below the mylohyoid muscle. If not removed suppuration will occur, with possible infection of the sublingual and submandibular spaces or involvement of the pharynx and glottis. (*Fig.* 3.)

The mucosa over the lingual plate must be incised, elevated, and the bone exposed. Every precaution must be taken to avoid damage to the lingual nerve which lies on the medial side of the roots of the third molar tooth and is covered only by the mucous membrane of the gum. The mylohyoid muscle is now detached and retracted and the root is exposed and removed. Suturing of the mucosa is contra-indicated.

Roots in the Antral Region.—There are wide anatomical variations in the size of the maxillary sinus and in its relationship to the premolar and molar teeth. Usually the second premolar and first and second molar roots are in close relationship to the floor of the sinus. Occasionally, the first premolar, canine, and third molar are related. In the case of a small sinus, the roots and sinus may be separated by a thick layer of cancellous bone. In a large sinus, a layer of compact bone or even mucosa may be all that separates the roots from the maxillary sinus.

When roots are retained in the antral region, an efficient radiograph is essential to discover whether the root is actually in the sinus or merely superimposed upon it. The radiograph should be examined closely for evidence of the radiolucent periodontal membrane. If it is present the root lies in the alveolar process. If absent, it may or may not be in the sinus. An occlusal radiograph should also be taken.

If the roots lie in close relationship to the sinus, the greatest care must be taken to avoid forcing the remnant into the antrum. The root should be exposed by the flap operation. All upward pressure is avoided and so forceps must not be used. All pressure by chisels, elevators, and curettes must be controlled and in a downward direction. To remove the apex of a retained palatal root, the buccal cortical plate and spongy bone must be removed until the root bifurcation is exposed. The root is then elevated downwards and outwards.

All roots which are lost or displaced into the maxillary sinus must be removed if possible, as they almost invariably lead to suppuration if allowed to remain. When the mucosa of the sinus is merely punctured and the root not retained, healing is usually by first intention. An aqueous solution of procaine penicillin, 300,000 i.u., should be given parenterally on four successive days. The patient is warned not to blow the nose, sneeze, or suck the socket. Rinsing the mouth is avoided for three days.

When the opening into the sinus is more extensive and the root has been found to lie in the antrum or under the mucosal lining membrane, no attempt should be made to remove it through the socket, which should be closed by sutures. In order to do this without tension, curved relaxing incisions must be made through the mucoperiosteum in the buccal sulcus and in the palate. The socket mucosa will now approximate easily. Mattress sutures should be used. With the collaboration of an oral surgeon, an oral antrostomy is now performed through the canine fossa. General anæsthesia is preferred, to permit packing of the post-nasal space and pharynx and so prevent blood entering the trachea. After opening the sinus, the cavity is illuminated and carefully inspected, and the root, if seen, is removed. If it is lying under the lining membrane, the bulge should be incised and the root removed. This is a difficult procedure, however, as the antrostomy opening usually lies at a higher level than the site of the retained root. A counter opening for drainage into the nose, below the inferior turbinate, is not usually necessary, unless the sinus is very infected. Normally, the oral antrostomy opening is sufficient. Suturing of mucoperiosteal flap is not necessary and healing is complete in about two weeks. Parenteral penicillin is given for four days post-operatively.

CONCLUSIONS

In view of the high incidence of retention of roots—nearly a third of cases referred for extraction of teeth under local anæsthesia show subsequent root retention—a plea is raised for:—

1. Increased or even routine radiographic examination prior to extraction of teeth, especially in the maxillary and mandibular premolar and molar regions.

2. Diagnosis of anomalous curvatures of roots or pathological changes in the alveolar process or roots, likely to cause difficult extractions, should be treated at the outset as cases requiring surgical removal of the teeth. By this means only will operative trauma be reduced to a minimum and healing accelerated, with a consequent saving of time and discomfort to the patient.

REMOVAL OF NAME

The name of Leo Robertshaw, 33, Mount Pleasant, Waterloo, Crosby, Lancs, has been ordered to be removed from any dental list in which it is now included. The name may not be included in future in any dental list unless the Tribunal or the Minister so directs.

TO OVERCOME FAULTY RETENTION OF CLASPS

When packing a partial plastic denture difficulty is often experienced in keeping the embedded ends of clasps, etc., inside the material. Sometimes they show on the fitting surface, thus weakening the denture and impairing their own retention.

This can be overcome by taking a small piece of flash from another denture, scraping any plaster from it, and wedging it between the model and the clasp tag, after boiling out the flash. C. H.

ORTHODONTIC SPRINGS FOR REMOVABLE APPLIANCES

By **J. S. BERESFORD**, B.D.S., H.D.D. R.C.S. Edin.

THE variety of springs available to an operator for use with removable orthodontic appliances depends largely upon his ingenuity. The principles involved and the numerous patterns of springs have been clearly described in the literature.

The greater the deflection of a spring exerting an orthodontic force, the fewer the visits for adjustment. Long springs of small diameter are therefore indicated as the deflection of a wire varies directly as the cube of its length and inversely as the cube of its radius. In practice stainless steel springs of 0·35 mm. diameter are useful but they need to be protected by a heavier wire or a shield of acrylic resin (*Fig.* 2). In making a removable appliance the effective portion of a palatal or lingual spring may be covered with a thin mix of plaster. This is neatly trimmed when set and

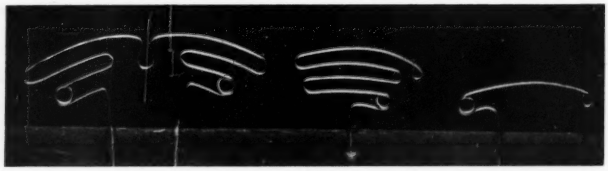

Fig. 1.—Springs (size 0·35 mm.) for the labial movement of teeth. These springs should be protected by the plate. That on the left crosses the median plane (e.g., to act on $\underline{1}|\underline{1}$). Springs and coils lie in a horizontal plane.

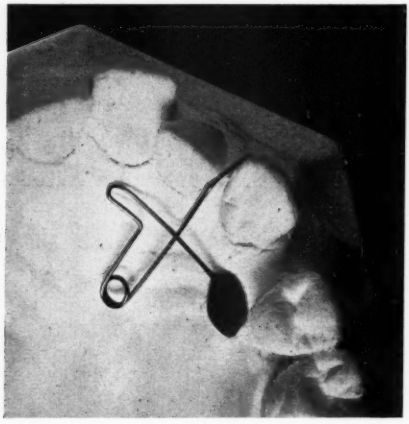

Fig. 2.—A 0·4-mm. spring for the distal (or medial) movement of a tooth. Protection is afforded by the recurved end of the wire.

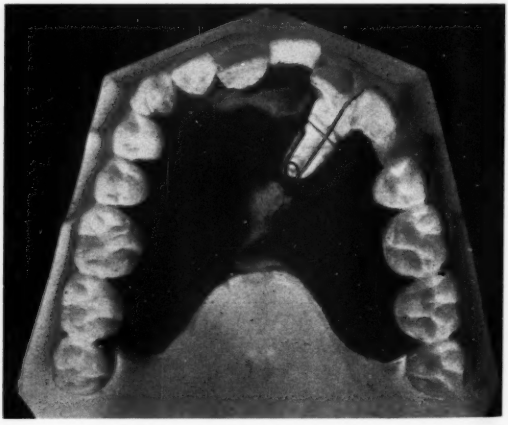

Fig. 3.—The same spring as in *Fig.* 2 "waxed up" (retaining cribs not shown).

A spring may be itself incorporated in the acrylic resin or it may be attached to a stouter wire, e.g., a labial bow incorporated in the plate. Attachment to a heavier wire is generally by wrapping about a loop (*Fig.* 8). The various welding methods are less satisfactory with removable appliances.

Fig. 4.—A 0·35-mm. flap spring designed to tip $\frac{21|12}{}$ labially and illustrating the protection afforded by the acrylic plate. A similar design may be adopted for the movement of a single tooth.

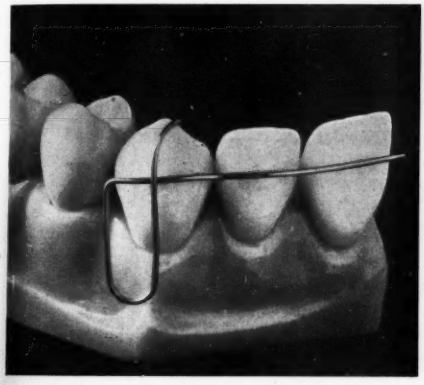

Fig. 5.—Part of a labial bow of 0·7-mm. s.s. wire. The cross-over pattern gives better control and facilitates adjustment of the loop.

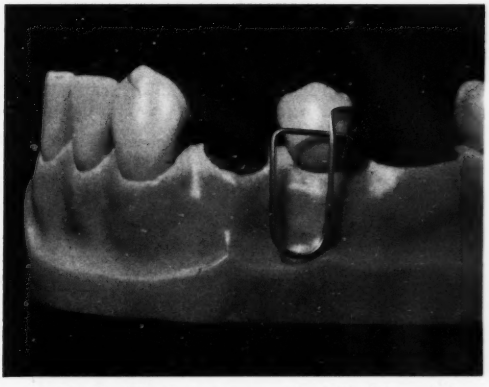

Fig. 6.—The same cross-over loop (in 0·6 mm.) serves as a combined spring and retaining clasp where a small amount of medial or distal movement is desired.

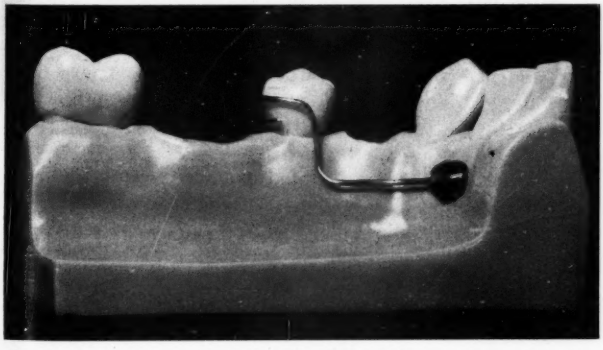

Fig. 7.—Lingual view of *Fig.* 6, showing the tag to be waxed up in the plate.

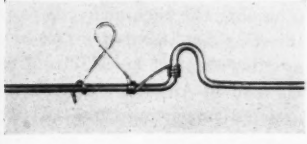

Fig. 8.—A "Rix" spring for medial or distal tooth movement attached to a stouter wire by wrapping about a bend.

the plate is waxed up over it. After processing, the plaster is cleaned away and the spring is free to work under the protecting acrylic shield.

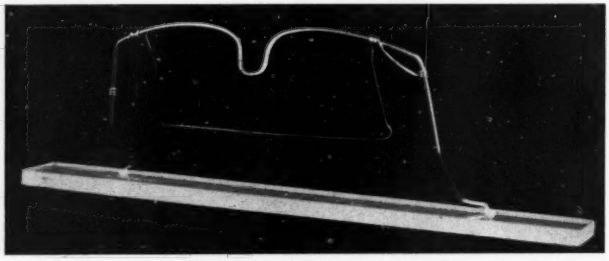

Fig. 9.—A model of a high labial bow carrying a flap spring for the palatal movement of the upper incisors. The spring is wrapped on to the bow after the plate has been processed and polished.

The accompanying illustrations are of simple springs which have been well tried in practice.

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A SIMPLE TECHNIQUE FOR CASTING COBALT CHROME ALLOYS*

By **J. R. BOSWELL**, F.I.B.S.T.

I AM going to talk to you to-night about cobalt chrome alloys and their application to dentistry, a subject which has caused a great deal of interest to the dental profession, both to the surgeon and technician alike: to the surgeon because he can see that in cobalt chrome alloy there is a material which can be used in dental restorations, both full and partial, which has many advantages over the precious metal alloys used at the present moment; the technician, because he is always thirsting for knowledge and new ideas for the advancement of his skill and craft. We have all read in American dental publications long articles concerning these cobalt chrome alloys, about how good they are and so forth, but apart from being told about their great clinical advantages we have never been able to glean much information as to how the alloys are cast. In fact, so deeply has the working technique been shrouded in mystery that it would have daunted the most enthusiastic Sherlock Holmes amongst dental technicians.

Let me tell you briefly about some of these alloys used in America, and their technique so far as I know it.

You will all be very familiar with one of these American alloys—indeed it is the best known cobalt chrome alloy in America, the "daddy" of them all. This alloy is a very fine product, but to the minds of many people it is too hard, somewhere in the region of 391 Brinell, and it is exceedingly brittle. It will not tolerate some minor adjustments sometimes found necessary when fitting an appliance.

To cast this alloy it is necessary to use special laboratory equipment such as:—

1. High-temperature furnace capable of reaching 1200° C.

* A talk given to the Dental Section of the Institute of British Surgical Technicians at the Eastman Dental Clinic on Oct. 23, 1951.

2. Sandblasting machine for cleaning up the casting and removing the oxide.

3. High-speed polishing lathe (20,000–25,000 r.p.m.).

4. Oxyacetylene melting torch.

As you can well imagine, it can be a very expensive business buying all this equipment, and so it rules out the small dental laboratories and the surgeon who has his own laboratory and employs his own technician. One other point: persons using this alloy have to be licensed by the manufacturers and sign a comprehensive agreement with them.

Another American alloy which is also quite well known falls roughly in the same category, except that the alloy is not so brittle. It contains less cobalt than the former, but makes up the difference with nickel and sometimes a small percentage of beryllium. Again this alloy is very good, though one still needs special laboratory equipment for processing it, such as:—

1. Special furnace.

2. Sandblasting machine.

3. Special casting machine, which apart from fulfilling all the usual functions of a casting machine, also electrically melts the alloy.

4. High-speed polishing lathe.

Again there is the licence and signed agreement with the manufacturers. There are many other American alloys, all of which need special equipment and the usual licence agreements.

During the last few years my friend and I have been very interested in formulating a simple technique for casting cobalt chrome alloys that would be acceptable to the dental laboratories, whether they be large or small, and to the profession in this country, or to private laboratories run by surgeons for their own use; a technique whereby no special equipment is needed apart from one or two small items; a technique whereby a technician would have freedom of supplies, without the irksome restrictions of a licence agreement, which to our minds is a retrogressive step.

After many disappointments we succeeded in perfecting this simple technique, details of which I shall now give you, but before I do there are a few points I must make clear to you. With this technique no special high-heat furnace is required—an ordinary Solbrig's or similar type will do.

No sandblasting machine is necessary because the investment can easily be removed from the casting with a knife, and owing to the investment being chemically pure the castings come out clean and not covered with chrome oxide. No special high-speed polishing lathe is required. An ordinary suspension motor with handpiece is quite sufficient for imparting a very high polish to the finished appliance.

No fatty polishing materials are used. Three types of abrasive strips followed up by a special type of polishing paste, which is water dispersed, is all that is necessary.

The alloy is a softer type of the cobalt group, having a Brinell of 241, which is comparable to a high quality platinized casting gold. Its specific gravity is 8, therefore the alloy is much lighter than gold, and it is also stronger than gold. It is totally inert in mouth and body fluids and so can be used with complete confidence for surgical implants.

TECHNIQUE

Anyone who can cast gold can cast this new type cobalt chrome molybdenum alloy, as the casting technique for both metals is basically

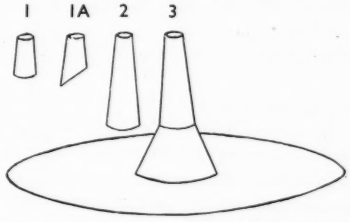


Fig. 1.—Cones for sprueing skeleton dentures. 1, 1A, Locator cones; 2, Hole-forming cone; 3, Main sprue-former and plate. All the cones have the same taper.

the same. Before we consider the technique in detail I should like to explain a new method for sprueing skeleton dentures. This is carried out with the aid of a special set of cones as illustrated in *Fig.* 1.

Direction for Use.—Fix locator cone 1 or 1A to master model with compound, as near

the centre of the denture design as possible. For lowers and flat uppers use locating cone I (*Fig.* 2). For sloping palatal surfaces of uppers use locator cone IA (*Fig.* 3). Always fix the cone vertically.

Casting Technique.—Prepare the model as for gold, and fix locating cones I or IA into position. Soak the model in tepid water, for ten minutes. Shake off the surplus water, place the model on the base of the duplicating flask and block out unnecessary undercuts with

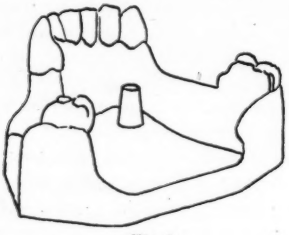


Fig. 2.

compound; fix the top of duplicating flask in position and pour in the duplicating material. A good quality agar-base duplicating material should be used to ensure a perfect impression. Place this duplicating flask into *half an inch* of cold running water for thirty minutes, so that the duplicating material cools from the base upwards, ensuring that the reservoir is the last part to solidify and can fulfil its function.

Remove base of flask and withdraw master model.

Mix the investment, which is a pure silica, with the special binder solution to the ratio of 1 part liquid to $2\frac{1}{4}$ parts powder. Locate cone 2 into the tapering hole in the duplicated impression and vibrate mixed investment into position.

Fill the impression and vibrate for a further 45 seconds. The investment material sets very rapidly and prolonged vibration would interfere with the formation of the gel and seriously affect the strength of the model. Allow 30 minutes for hardening, then push the duplicating material from the flask. Make two or three cuts in the duplicating material and peel it gently from the model, which at this stage must be handled with great care.

Remove cone 2 from the investment model (leaving tapering hole with a smooth dense surface).

Dry out the model in the usual way and immerse in molten beeswax for 30 seconds. Take out the model, stand it on its heels and let it drain; it will now be reasonably hard and with a slightly tacky surface. Now wax up in the usual way.

Smear a little sticky wax on to the warmed cone of the sprue-former (3), and fit it into the

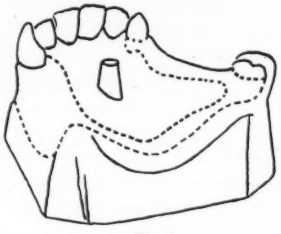


Fig. 3.

hole on the model. Attach the branch sprues to the cone at the *level of the model.*

It is important not to attach the branch sprues to the tip of the cone as this "riser" prevents swirling of the metal at the juncture of the main sprue and the branch sprues, and also keeps open the channels for a longer period, acting as an additional reservoir helping to prevent contraction and porosity of the casting.

Line the ring with $\frac{1}{16}$ in. thickness of dry asbestos sheeting. Ensure that there is a small overlap and that the asbestos fits flush with the base of the ring. Place the ring into position on the base of cone 3 (*Fig.* 4), thus encasing the model which is fitted to the metal sprue. Seal the ring to the base with compound. Fill the ring with water (at room temperature) and pour away after 30 seconds. *Do not press* the asbestos tightly to the sides of the ring with the fingers.

Mix up the investment, this time 1 part liquid binder to 2 parts powder, and vibrate the mix into the ring, continuing the vibration for exactly 45 seconds after the ring has been filled. Place the ring on one side (well away from the vibrator). Allow a setting time of 30 minutes.

Remove the compound, apply gentle heat to the base of the sprue-former, and remove with a slight twist.

The ring can now be placed in a gas or electric furnace and gradually taken up to a temperature of 300° C. during the first two hours. The temperature should now be raised to 750–800° C. over a period of one and a half hours. Soak at this temperature for 30 minutes. Pre-heat the alloy in the crucible of the centrifugal casting machine, protecting the back plate of the machine by placing a spare casting ring between it and the aperture in the crucible.

Remove the ring from the furnace and place it into position on the casting machine.

Melt the alloy, using an oxyacetylene blow-pipe with a special rose tip.

The alloy contains its own fluxing agents, which form a protective coating on its surface when molten. The alloy is ready for casting when it has collapsed and become rounded at the edges. Do not expect a rippling, mirrored surface, as with gold.

Do not over-heat. Keep the flame on the metal until the very moment of casting. Cast the denture.

Allow the ring to bench-cool for an hour. Cooling can then be expedited by sprinkling with water.

Remove the sprues and sprue-stubs with cut-off wheels and grinding stones.

Go over the surface of the denture with coarse, medium, then fine polishing strips in a split mandrel.

Mix polishing powder with water and apply with super-felt wheels and cylinders. Use minimum pressure and maximum speed, allowing the polishing powder to do the work.

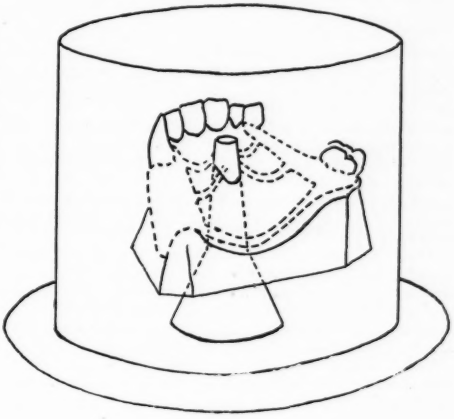


Fig. 4.

Composition of Alloy.—The main elements present are chromium, cobalt, and molybdenum. Carbon, magnesium, silicon, aluminium, nickel, and columbium are present in small quantities.

The figures below are for the alloy as cast. It is austenitic and, therefore, heat treatment is unnecessary.

Investment temperature ..	750–800° C.
Melting-point	1280° C.
Specific gravity	8
Yield point	63,400 lb./sq. in.
Tensile strength	89,600 lb./sq. in.
Elongation	10 per cent.
Brinell hardness	241
Electrical resistivity ..	310×10^{-6} ohms per cm.
Coefficient of expansion .. (per degree Fahrenheit)	$9{\cdot}2 \times 10^{-6}$

DENTAL BOARD OF THE UNITED KINGDOM

CATALOGUE OF FILMS

(*Continued from p.* 150.)

FILMS ON CONSERVATIVE DENTISTRY

CD.2.—*Dental Amalgam Failure caused by Moisture Contamination* (National Bureau of Standards, U.S.A.); 15 minutes; 16 mm.; colour; sound; hire charge £1.

Failures due to moisture contamination of dental amalgam are well illustrated and presented with scientific accuracy and details. Excessive expansion, blister formation, reduced strength and post-operative pain following large amalgam restorations can be prevented.

CD.7.—*Gold Inlay—Copper Plating Technique* (Dr. Mandiwall—1948); 35 minutes; 16 mm.; colour; silent*; hire charge 30s.

This film describes in detail the making of gold inlay by the indirect method using an electrically deposited copper die. Different methods of impression taking are also shown.

CD.9.—*Gold Inlay Technique* (Royal Air Force—1945); 30 minutes; 16 mm.; colour; sound; hire charge 30s.

This film shows construction of a bridge of fixed movable type, employing a $\frac{3}{4}$ crown inlay in $\underline{3}$ and inlay

restoration in $\underline{|1}$ replacing $\underline{|2}$. Each stage is also demonstrated on a plaster model.

CD.10.—*Hydrocolloids in Inlay and Bridge Construction* (Dr. Mandiwall—1948); 30 minutes; 16 mm.; colour; silent*; hire charge £1.

This film deals in detail with the technique and principles of the use of hydrocolloid.

CD.12.—*Porcelain Jacket Crown* (Dr. Mandiwall—1942); 20 minutes; 16 mm.; colour; silent*; hire charge £1.

This film deals in detail with laboratory technique of a porcelain jacket crown on $\underline{2|}$. It also shows several cases before and after jacket crowns have been completed.

CD.13.—*Silicate Cement* (National Bureau of Standards, U.S.A.); 20 minutes; 16 mm.; colour; sound; hire charge £1.

This film shows how shrinkage, loss of strength, staining, and solubility can be avoided in a silicate restoration by observing two cardinal principles: (*a*) having a thick mix and (*b*) preventing gain or loss of moisture. An impressive film showing accurate experiments in establishing the facts enumerated in the film.

CD.14.—*Apicectomy* (Messrs. Anderson and Hardwick, Birmingham—1950); 15 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows two methods of operation: (*a*) Prior root filling before removal of apex—this method is shown in detail and explained by animation. (*b*) Apicectomy and root filling together—only those aspects which differ from the first method are shown.

Films on Maxillo-facial Surgery

MF.2.—*Technique of Arch Wiring for Fractured Jaws* (East Grinstead); 16 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows the technique of jaw fixation by means of arch wiring. The treatment of a case of fracture of the angle of the mandible on the right side is shown.

MF.3.—*Block Bone Graft in Jaw* (East Grinstead—1947); 30 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows the insertion of bone graft in the mandible to a patient with an ununited fracture in the lower incisor region.

MF.4.—*Chip Bone Graft to Mandible* (East Grinstead—1941); 25 minutes; 16 mm.; colour; silent; hire charge £1.

This film shows the technique in vogue in 1941 for the grafting of a patient with an ununited fracture of the edentulous mandible. The insertion of a chip bone graft, immobilization of the fragments by Roger Anderson pins, followed by intermaxillary fixation by an upper plate fixed to the maxilla with alveolar wires, and a lower by circumferential wires.

MF.5.—*Construction of Cap Splints* (East Grinstead); 40 minutes; 16 mm.; colour; silent; hire charge £1.

This film shows the construction of cast silver cap splints for the immobilization of fractures.

MF.7.—*Eyelet Wiring* (East Grinstead); 15 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows the technique of jaw fixation by means of eyelet wiring. The treatment of a case of fracture of the mandible is also shown.

MF.8.—*The Treatment of a Gunshot Wound in the Mandible* (East Grinstead); 20 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows management and treatment of a gunshot wound to the mandible both by surgical means and by splinting to the mandible.

MF.9.—*Infected Fracture* (East Grinstead); 10 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows the management and treatment of an infected fracture of the mandible both by surgical means and by splinting (pre-penicillin days).

MF.11.—*The Treatment of a Gunshot Wound in the Mandible and Maxilla*; 45 minutes; 16 mm.; colour; silent; hire charge £1.

This film shows the case history in which the preliminary plastic and dental treatment is followed by the application of cap splints and Roger Anderson pins.

MF.12.—*Crush Fracture of the Middle Third of Face* (East Grinstead); 20 minutes; 16 mm.; colour; silent; hire charge £1.

This film shows fixing a splint to the maxilla and stabilizing the maxilla by a bar fixed to a plaster head cap. The mandible is then supported by inter-maxillary wiring.

MF.14.—*Roger Anderson Pin Technique* (East Grinstead—1943); 20 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows the preparation and shaping of pins and fixing of posterior fragment of fractured mandible on the right side. The fracture is stabilized by connecting the pins to an extension bar from the lower cap splint, and mandible is fixed to maxilla by splint wiring.

MF.15.—*Roger Anderson Pin Apparatus* (East Grinstead); 10 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows relative merits of different types of Roger Anderson pin apparatus. These are inserted into a wooden beam and the beam is weighted.

MF.17.—*Surgical Wiring of Bone Ends* (East Grinstead); 20 minutes; 16 mm.; colour; silent; hire charge 10s.

This film shows in detail the operative technique of surgical wiring of bone ends in a case of fracture of the mandible.

MF.18.—*Treatment of a Mandibular Fracture* (Royal Army Dental Corps—1943); 15 minutes; 16 mm.; monochrome; silent; hire charge 10s.

This film shows first aid and treatment of fractured $\underline{43|}$ on a barrel bandage, cap splints with connecting bar. A closed cap splint is used to train muscles to compensate for deviation following fracture of neck of condyle of mandible.

MF.19.—*The External Elastic Sling* (Royal Army Dental Corps—1943); 15 minutes; 16 mm.; monochrome; silent; hire charge 10s.

This film shows how an external elastic sling attached to a cap splint is used to train muscles to compensate for deviation following fracture of neck of condyle of mandible.

MF.20.—*The Training Flange* (Royal Army Dental Corps—1943); 15 minutes; 16 mm.; monochrome; silent; hire charge 10s.

This film shows how a flange attached to a cap splint is used to train muscles to compensate for deviation following fracture of neck of condyle of mandible.

Films on Orthodontics

O.5.—*Serial Study of an Occlusion from Birth to Ten Years of Age* (Dr. Sillman, U.S.A.—1947); 40 minutes; 16 mm.; colour; silent*; hire charge 30s.

This film shows serial models taken at frequent intervals from birth to ten years of five cases; one case shows normal occlusion and the others show various abnormalities, particularly those caused by early extractions.

* An asterisk denotes that a commentary can be supplied with the film.

NEWS FROM DOWN UNDER

AUSTRALIAN LETTER

Nov. 29, 1951.

DENTISTRY in Australia could be approached along many different lines. What I hope to do in this first letter is to point out the broad plans of professional organizations in Australia, of State Health Services, and of Dental Education.

The Australian Dental Association.—The Australian Dental Association is like our Commonwealth Government, a Federal body with affiliated Branches in each State except the Northern Territory. These State Branches are the result of the amalgamation of earlier groups like the Odontological Society, which formed a Federal body in 1928. State Branches are autonomous within their own States and pay a yearly levy to the Federal body. The Federal office is usually in Melbourne or Sydney, and its main function besides co-ordination is to arrange and hold an All-Australian Dental Congress at least once every three years. The last Congress was in Sydney, in August, 1950. State Branches are also able to arrange and hold similar local Congresses and Refresher Courses. It is through the Federal body that approach is made to the Federal Government on all matters affecting dentists as a whole throughout Australia. Discussions regarding such things, for example, as a National Health Service, and treatment for ex-Servicemen and their dependents, are arranged by and through the Federal body.

State Health Services.—Most of the Australian States have School Dental Health Schemes which vary widely in extent and efficiency. These are attempts by the Governments concerned to bring dental treatment to children who, for reasons of our scattered rural population, would otherwise be prevented from obtaining any dental treatment at all.

Methods employed vary from State to State but they include dental trains, caravans, and dentists moving from one country centre to another with mobile equipment. Of these three methods, the dental train, as employed in Victoria, New South Wales, and Queensland seems to be by far the most efficient. Here one or two carriages are converted to contain working and living accommodation, and the train is shunted to a country siding. A "feeder" bus, housed in the train, is then driven to schools in the area and the children are brought to the siding for treatment. The dentist, his attendant, and an orderly-driver-mechanic comprise the staff. The caravans where employed are similar to many of those used in Great Britain.

So far there is no all-embracing National Health Service in Australia, but the Commonwealth Government has recently widened the scope of the dental treatment afforded to invalid pensioners and invalid ex-Servicemen and their dependents under the repatriation departments. Negotiations regarding this treatment are still proceeding and the treatment will be both on a "fee for service" basis and by private dentists working on a sessional basis, in the repatriation department clinics. In this respect this scheme is a very similar one to the provisions made under the British National Health Services. It remains to be seen how efficient such a scheme will be in Australia.

Dental Education.—All States, except Tasmania and Northern Territory, have Dental Schools attached to the Universities. The present number of undergraduates is approximately 1400, and the average number of graduates per year is 290. The courses are all to the B.D.S. or B.D.Sc. standard and are of four or five years' duration. Post-graduate study provision is made for further post-graduate studies proceeding to M.D.S. or D.D.Sc. degrees. Recognition of American degrees of dentistry is not uniform in Australia. This, in combination with our migration policy, is causing much confusion to New Australians with dental qualifications wishing to practise. In some States they are required to do three years of our course, in others two years or only one year. Any dental qualification which is satisfactory for registration with the Dental Board of the United Kingdom is satisfactory to all State Dental Boards in Australia.

INSTITUTE OF BRITISH SURGICAL TECHNICIANS (INC.)

A LECTURE by Mr. Horace H. Boyle, H.D.D., L.D.S., on "Complete Dentures", was followed with close attention and interest by members

Horace H. Boyle, H.D.D., L.D.S.

of the Dental Section of the Institute of British Surgical Technicians, at the Eastman Dental Hospital, on Jan. 8, 1952.

Commencing with a chronological survey of the history of prosthetic dentistry since 1908, the lecturer introduced his sphero-ellipsoidal theory and its practical application to the edentulous problem, continuing with the making of concentrically occluding bite-blocks, the setting-up of artificial teeth to the sphero-ellipsoidal principle, including the use of calibrated sphero-ellipsoidal curvature planes. Observations on processing defects of acrylic dentures were followed by suggestions for their correction in the laboratory and reflections on the peripheral finishing of complete dentures.

The lecture was illustrated by lantern slides and a film showing procedures used over eighteen years for constructing upper and lower dentures in normal circumstances and modifications suggested in certain abnormal cases.

Mr. E. G. Emmett presided over the meeting in the absence through illness of the Chairman, Mr. Chas. B. Phillimore, and in introducing Mr. Boyle referred to the world-wide interest aroused by his theory and technique. Mr. H. J. Potter, in expressing the thanks of the members, paid tribute to the valuable contribution the lecturer had made to a subject which was of great interest to all dental technicians, and to the friendly and lucid way in which he had expounded his theories.

BOOK REVIEW

PHARMACOLOGY AND DENTAL THERAPEUTICS. By E. C. DOBBS, D.D.S., and H. PRINZ, A.M., D.D.S., M.D., Sc.D., Dr. Med. Dent. Tenth edition. Pp. 599. 1951. London: Henry Kimpton. 60s.

THIS is the tenth edition of an American textbook first published in 1909. It deals systematically with most of the drugs that a dental student or practitioner will want to know about, and includes such up-to-date remedies as aureomycin and chloromycetin, though not the methonium compounds or other synthetic drugs which relax muscles. However, the atmosphere of 1909 predominates, and a lot of space is taken by accounts of materia medica and botanical origins; and some drugs, once used but now usually regarded as dangerous, such as sulphonal, appear with scarcely a warning. There are plenty of impressive but unnecessary technical terms, like singultus and somnifacients, but a lack of precision in giving therapeutic advice; for example, it is useless to advise dieting with no indication of the diets to be used, and dangerous to specify doses in cubic centimetres without quoting the concentration of the solution. The usefulness of the book will in any case be limited in this country because it deals only with the U.S. Pharmacopœia, formularies, and laws about the use of drugs, and these are not always identical with practice in Britain.

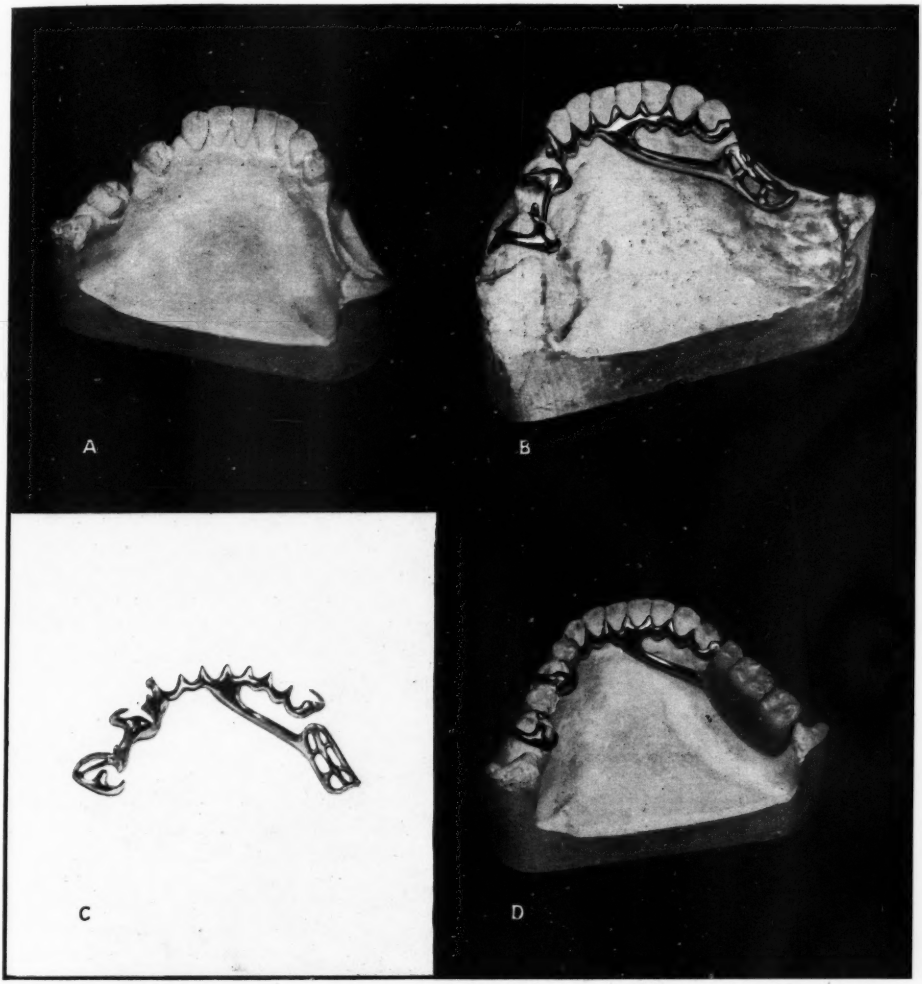
M. W.

Issued with "The Dental Practitioner", February, 1952, Vol. II, No.

PARTIAL DENTURE CONSTRUCTION PROBLEMS

CHART No. 9

A METHOD OF DEALING WITH A LOWER DENTURE WITH ONE FREE END SADDLE



Examination of the mouth showed a condition with a Class II saddle (Beckett classification) in the region, and two Class I saddles (Beckett) in the region. The case was treated by designing a one-piece metal skeleton partial denture. The design was such that the $\frac{43}{}$ $\frac{}{357}$ were fitted with occlusal rests, thus making both Class I saddles entirely tooth-borne. The condition of the abutments was such that they were classified as being able to support the extra occlusal load. The Class II saddle was connected to the rigid tooth-borne support by a flexible connector. The denture was retained by clasps on $\frac{4}{}$ $\frac{}{357}$, thus rectifying the laws of Direct and Indirect retention. The Class II saddle was rebased by the closed mouth technique using a compound wafer and a wash of impression paste, thus making it tissue-borne and acting independently of the tooth-borne section.

Chart A, The model of case as presented.
Chart B, The framework on model.
Chart C, The framework off model.
Chart D, The finished denture.

C. T. YOULES.

OFFICIAL SUPPLEMENT OF THE

SURGICAL INSTRUMENT MANUFACTURERS' ASSOCIATION (INC.)

DENTAL LABORATORIES SECTION

Chairman: E. G. EMMETT, F.I.B.S.T.
Administrative Offices: 6, HOLBORN VIADUCT, LONDON, E.C.1
Telephone: CITY 6031

No. 11 February, 1952
Editorial Committee: MR. C. M. BOOTH; MR. H. J. POTTER, F.I.B.S.T.

EDITORIAL

ALTHOUGH by the time this Editorial appears in print 1952 will be well on its way, at the time of writing we have many anxieties regarding the proposed New Legislation; it is, nevertheless, hoped that you will have "got away" to a very good start.

During 1951 a number of milestones in the history of dentistry, and indeed of our own Association, have been passed, and now, with the enactment of the "Dentists Bill, 1952" expected this month, we must be prepared for revolutionary changes. The members of S.I.M.A., together with technicians in general, are dismayed that the technician as such is not thought worthy even of mention in the proposed Bill. Their concern is understandable more particularly because so many eminent dental surgeons have in late years emphasized the importance of the work of the Laboratory man in the "Dental Team", and of the urgent need for ever closer co-operation between the Laboratory and the Surgery. We trust that before the Bill has reached its final form the technician will find his rightful part written into it and that his position will be established and made clear. Our organization will do all it can to ensure this is done.

The result of the Arbitration Tribunal will not reach us in time to include a report in this Editorial, but there is no doubt that the livelihood of many technicians will be influenced by the findings of this court.

The Co-editors record their grateful thanks to all who have supported their efforts since the first contribution to this journal was made, but appeal for much greater support in the future. The need is for a flow of technical articles, and we would welcome criticism—adverse or otherwise—for without this we cannot know the wishes of our readers.

We are always seeking details of new equipment for our popular feature "Is this what you are looking for?", and any other matter of general interest. Over the course of the years there must be many practices used in Laboratories which, if known, would prove of interest and profit to many of your colleagues; send us a brief description of them, we will gladly edit them for you.

Our Conference Week-end will no doubt include a lively Annual General Meeting; we hope it will be preceded by a successful Dinner and Dance. It is certain that you will appreciate the exhibition of equipment and techniques by members of the Dental Traders' Association sponsored by S.I.M.A. as part of the week-end activities.

CAN YOU BELIEVE IT?

Occasionally, complaints are received about seepage around the necks of both porcelain and acrylic teeth on finished dentures. On investigating these complaints, it invariably shows that the technician has either been indiscriminate in the use of the model coating solution when painting the plaster work of the flasked denture, or he has followed the policy of pouring the model coating solution into the tooth half of the flask and then inverted the flask to allow excess solution to drain away.

RHODIUM PLATING

By E. H. LAISTER

The process of rhodium plating was developed some years ago, with the idea of providing a hard-wearing, tarnish-free plate of good appearance for the finishing of various articles of domestic and commercial use.

The outstanding properties of this metal are its hardness, white colour, and complete resistance to corrosion. It is relatively easy to electro-deposit, and has found considerable application, among other items, for the finishing of metal dentures, and also to some slight extent for certain dental instruments.

Rhodium is one of the metals of the platinum group, occurring in the platinum ores in comparatively small quantities. As would be expected, it is a very expensive metal, and can, therefore, normally be used only in the form of extremely thin deposits.

It should be appreciated that the rhodium plating of dentures does not materially increase their wearing life. It does, however, prevent unsightly discoloration from the action of food acids, sulphur compounds, etc. Where serious abrasion takes place, of course, the deposit will wear off, but the abrasion itself will keep this area scoured and bright, while the inaccessible depressions will remain in their original bright condition, apart from any actual physical deposits. These, however, would normally be removed daily for hygienic reasons. In addition, the clean white colour of the rhodium is an added attraction to the appearance of a new denture.

For those who wish to carry out the rhodium finishing themselves, suitable outfits are supplied commercially, and the process is quite simple.

The apparatus is set up on a suitable bench, and the only electrical connexion required is the attachment to a power plug. A beaker is filled with the electrolytic cleaner solution, while the rhodium solution is made up in another. The rhodium is supplied in the form of a concentrated solution, and merely requires dilution with water to the appropriate volume. Distilled water is recommended, but not essential. The cleaner is operated hot for greatest efficiency, but if there is any danger of very hot solutions causing distortion or damage to plastic or similar parts, it may be used just warm, allowing a correspondingly longer immersion time.

The rhodium plating bath works at approximately 35° C., and this temperature should not be greatly exceeded.

The parts are prepared in a clean polished condition, and hung on thin copper wires, which are then attached to the clip on the plating lead. On immersion in the cleaner, a gentle effervescence will be caused by the current passing, and will rapidly free the work from traces of grease, etc. After about half to two minutes, according to temperature, the work should be thoroughly rinsed in clean, preferably running water, and should then be free from water-break.

All that now remains is to immerse the work, still attached to the clip, in the rhodium plating bath for the appropriate time, according to the thickness of plate required. The plating current is adjusted to about 0·2 amps. for every square inch of surface being plated, and a suitable time for general purposes will be three to four minutes. Under these conditions, each gramme of rhodium will plate about 120 square inches. The anode used is platinum, and is insoluble, merely serving to conduct the plating current into the solution. It is necessary to replace the rhodium used by means of the addition of further quantities of concentrated rhodium solution, or "syrup". About $\frac{1}{2}$ g. at a time is suitable.

In the foregoing brief outline of the procedure, it has been assumed that the normal light deposit is required, on one of the usual dental alloys. Heavier deposits may be applied of course, if desired, by increasing the plating time, at a reduced current density, but really thick plates to withstand hard wear on the actual rhodium, give rise to certain technical difficulties, and anything over about 0·0001 in. (say half an hour plating time) is best carried

out by a firm specializing in such work. It is also liable to be very expensive, and has so far found little application in this field, although widely used elsewhere.

It would, of course, be possible to apply some 0·0005 in. to 0·001 in. of rhodium to a denture made of one of the commoner base metals, but such a procedure cannot be recommended, owing to the danger of exposure of the base metal at some point, which would be very unpleasant to a user.

On the other hand, considerable use is made of stainless steel, and it is sometimes desired to apply a light deposit of rhodium as a finish to this metal. Many such alloys, however, cannot be plated directly with rhodium, and the necessity for the use of the normal undercoat of copper would be highly undesirable.

Certain stainless steels appear to plate quite satisfactorily, and it is therefore suggested that, if such a combination is wanted, a test should be made beforehand, to confirm that the particular alloy in use can be plated directly, or a more suitable stainless steel can be selected.

Mention was made earlier of the plating of certain dental instruments. It will be understood that it is difficult to obtain satisfactory protection by electroplating on any kind of cutting instrument owing to the necessity of maintaining a sharp cutting edge, but rhodium has been successfully applied in other cases, and will withstand boiling and sterilizing, while it is completely hygienic, and gives no sensation of taste. If properly applied it is impervious to the action of blood, which has normally such a highly corrosive effect.

For a given thickness, rhodium, on account of its great hardness, gives better resistance to wear than the vast majority of other metals, and apart from its attractive appearance it is this property which has made its use economically practicable.

PERSONALITIES

Chairman of the West of Scotland Branch: **THOMAS S. REID,** F.I.B.S.T.

Personal sacrifice and inconvenience always appear to be the lot of any enthusiastic official. Thomas S. Reid is no exception, and in being the Branch representative on the Main Committee of the Dental Laboratory Section of S.I.M.A. for five years he has with marked regularity had to spend two nights travelling for one day's committee meeting in London—such is his enthusiasm.

A native of Paisley, Renfrewshire, and educated at Camphill Secondary School, he started his career in dentistry with an apprenticeship with Dr. Donald Crerar, and three and a half years later went to Mr. R. Y. Richmond, L.D.S., where he spent the next eleven years acquiring some of the skill that was later to assist him to open his own Laboratory. This he did in 1932, and in 1938 Mr. A. B. Rae joined him in partnership. Membership of S.I.M.A. dates from 1941, and the need for closer co-operation between professional laboratories being apparent, he was instrumental in forming the Glasgow and West of Scotland Dental Laboratory Association in 1944, which two years later was to

become affiliated to S.I.M.A. Since that time he has been their assiduous and hardworking Chairman. The enthusiasm and interest he

has fostered and encouraged in the Branch was apparent by the Branch's excellent and original Table at the Annual Conference Week-end of 1951.

In June, 1947, he qualified by examination for the Licentiate of the Institute of British Surgical Technicians, and six months later became a Fellow of the Institute. On the formation in May, 1950, of the Local Joint Training Committee of the N.J.C., he was appointed the S.I.M.A. representative. The result of their labours was evident in the starting of classes for Dental Technicians in January, 1951.

On the personal side, both Mr. and Mrs. Reid are interested in Church affairs; he is Deacon of Sherwood Church, whilst Mrs. Reid is Secretary of the Womens' Guild. Their hobbies are gardening and golf, both being members of Elderslie Golf Club, and formerly Mr. Reid was President of the Ralston Tennis Club. His interest in this club is still retained as is evidenced by the fact that he is its Honorary Vice-President.

NEWS FROM HEAD OFFICE

A MEETING of the Main Committee was held at Head Office on Dec. 6, 1951, when the following matters, among others, were considered:—

Payment during Sickness.—Inquiries had been made by the trade unions as to whether the Employers' proposal that sickness benefit payable under the National Insurance Act should be deductable from an employee's wages during sickness included dependents' and children's allowances or payments made under the Industrial Injuries Act. The matter had therefore been referred back to the Employers' Side for clarification. The Main Committee agreed that S.I.M.A. should support the B.D.A. in this matter.

Education Advisory Committee.—It was noted that endeavours were being made to encourage a closer liaison between the N.J.C. Education Advisory Committee and the City and Guilds of London Institute, and it was thought that the reconstitution of the N.J.C. Education Advisory Committee would assist in this direction. We are informed that the City and Guilds syllabus is now under review and it was hoped that various alterations and adjustments would be put into operation this year.

Dentists' Bill.—Consideration was given to the Dentists' Bill and particularly the provisions relating to the employment of ancillary workers. It was decided to explore the possibility of some liaison with the B.D.A. and the trade unions on the Bill, and in the meantime to ask all Branches of S.I.M.A. to ascertain the views of their members so that the Association's policy on the Bill could be formulated at an early date.

Chrome Cobalt Alloys.—The Committee expressed appreciation of the co-operative attitude of some of the firms marketing chrome cobalt alloys, and it was noted that costings were under consideration by a sub-committee, the findings of which are now available for the guidance of members.

Supplies of Plaster.—It was reported that members were still experiencing difficulty in obtaining adequate supplies of suitable plaster, and particularly of Kaffir "D" and similar materials. It was therefore decided to make a further approach to the Ministry of Health on the subject.

Trade Discount.—The dental houses had intimated that they were unable to concede a trade discount to bona fide dental laboratories or to reinstate the cash discount of 5 per cent. It was therefore agreed that it must be left to individual members to pursue the matter if they felt disposed to do so.

New Members.—The following laboratories have been elected to membership of the Association.

FULL MEMBERS

S. Billcliffe, 1a, Ardee Road, Preston.
W. J. Line, 14, High Street, Windsor.

AFFILIATED MEMBERS TRANSFERRED TO FULL MEMBERSHIP

P. Cuthbert, 2a, Newgate Street, Morpeth, Northumberland.

A. J. Byrnes, 11, Portland Place, W.1.

AFFILIATED MEMBERS

F. C. Grayson, 11, Watford Road, Kings Langley.

Powell and Wells, 9, Beddington Gardens, Wallington.

Hoylake Dental Laboratory, 35, Aldersley Road, Hoylake.

Kirk and Hall, 1, Railway Street, Bishop Auckland.

Changes of Address.—The following members have removed to the addresses noted below:

J. S. Fountain, 21, Circus Drive, Glasgow, E.1.

F. M. Peare, 100, Boundary Road, St. John's Wood, N.W.8.

S. S. Dental Laboratories, 67, Woodcote Hurst, Epsom.

IS THIS WHAT YOU ARE LOOKING FOR?

COMBINED WAX-PAN AND BUNSEN

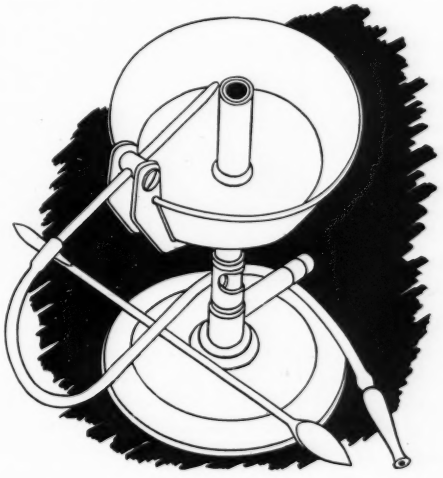
DENTAL technicians, because of the nature of their work, are adaptable and inventive. Visit any laboratory, it is remarkable just how many helpful hints and gadgets you will find.

In this month's article we feature an adaptation to the ordinary standard bunsen tube which is rather ingenious, and would appear to be a great help in waxing-up. This wax-up outfit is designed and produced by a professional laboratory where it had been in use for more than two years, and it is claimed that it is an indispensable part of the equipment used.

The wax-pan or reservoir is of spun and brightly polished aluminium with a welded-in inner sleeve which is made to push fit the normal bunsen tube. This degree of fit provides for (*a*) easy removal, (*b*) easy adjustment for height on the bunsen tube (which adjustment consequently controls the degree of fluidity of the wax), (*c*) close adaptation and good conductivity. The pan provides an ever-ready supply of molten wax which is replenished by adding old bite blocks and scrap wax. The gentle heat from the bunsen allows dirt to settle on the bottom, thus ensuring that waxing-up is cleaner, faster, and economical. There is no need to soften wax over the bunsen flame and therefore the bunsen tube air-intake is kept cleaner.

The spoon spatula, which is supplied with the outfit, is essential for this method of waxing up, its slender lines making it pleasant to handle and encouraging neatness.

The long flexible tube to the blowpipe enables the technician to view his work from



a convenient angle and the fine jet makes for precision and lessens the danger of scorched acrylic teeth. The blowpipe is attached to the bunsen by a bracket which allows it to traverse the pan rim if desired and when flicked to the horizontal, it is correctly positioned in relation to the flame. With this blowpipe assembly, the soldering of orthodontic

wires at the bunsen is made a great deal easier. The technician is able to support his hands on the bench between himself and the bunsen, and by reason of the mobility of his blowpipe can direct the flame towards the work. Because he is in the best position to view the operation he may cut out the blowpipe action immediately fusion takes place. This obviates the present procedure of the technician moving his hands forward to the bunsen at the risk of such movement displacing the parts to be soldered.

ODDS AND ENDS

Collected by **D. M. BEAUCHAMP**

Plastic Direction Arrows for Screw Orthodontic Appliances.—A nicer result than a bur or sculptor-cut arrow is achieved by the use of a preformed dentine arrow.

Into a flaskable size piece of brass plate, block tin, or plumbers' solder, with an extra sharp cold chisel cut as many arrow impressions as possible; sink this metal mould in plaster, level with the edge of a flask half. Cover arrow impressions with a No. 6 casting wax, and complete flasking; de-wax and process with dentine opacified with a little zinc oxide—a good mixture is clear acrylic and ZnO in proportion 2 to 1.

From the resulting blank, as needed, fretsaw off small sections, each bearing an arrow in relief; grind roughly to point and press (arrow downwards) into softened wax pattern of appliance in suitable position; flask and process appliance. The rough dentine moulding will unite with the appliance, and the portion formed by the No. 6 casting wax is carefully ground down till the arrow shape is revealed. *Important*: Prior to plastering the arrow, ascertain the screw's turning direction, and pencil an arrow on model outside area covered by appliance, to ensure proper directioning of plastic arrow.

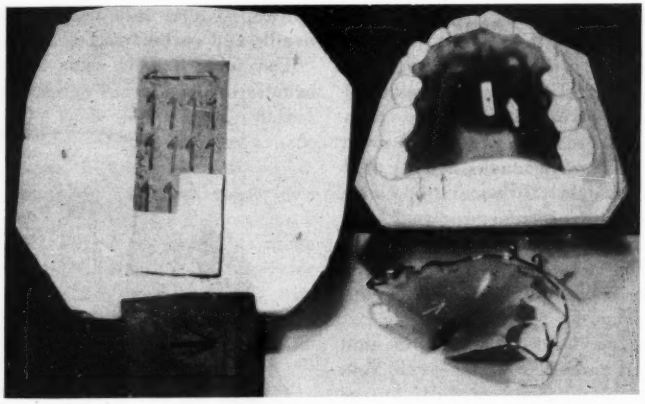


Fig. 1.—Preformed plastic direction arrows for screw appliances.

To Avoid Spoiling the Mirror Polish of Steel Plates.—To ensure that the polished surface is not marred by carbon-steel tools:—

a. When preparing bite rims for setting up teeth, use a brass wax knife.

b. When deflasking, use a digger made from hard brass strip, say, $\frac{3}{8} \times \frac{1}{8}$ in. and 6 in. long; sharpen the ends at right angles to each other, so as to produce in one tool a wide cutting edge for scraping away plaster from the polished lingual surface, and a narrow

cutting edge for breaking away the model ridges from the polished palatal surfaces.

c. When finishing the plastic near the beading, use phosphor-bronze scrapers, made by soldering to a brass handle, sawn off and hammered segments of phosphor-bronze disks.

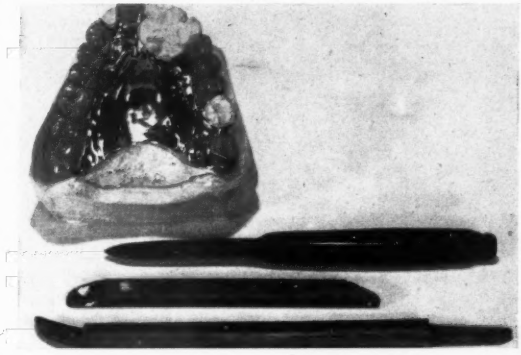


Fig. 2.—Improvised phosphor-bronze scraper for finishing stainless steel.

This scraper will not keep an edge too long, but continual sharpening is less irksome than trying to remove scratches from a steel denture.

An Aid to Symmetry in Orthodontic Anchorages.—When providing for apron springs on labial bows attached to removable appliances, the four right-angle bends comprising each anchorage appear better when equidistant. Divide the length of the tapering beaks of an ordinary snipe plier by four or five filed circumscribing marks. Engrave each mark with the distance across the flat, or with arbitrary numbers 1 to 5. Precise distances are easily bent off by selecting a suitable part of the tapering beaks, the number of which is noted for following bends.

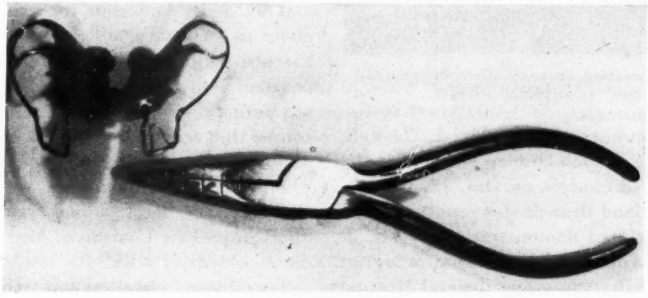


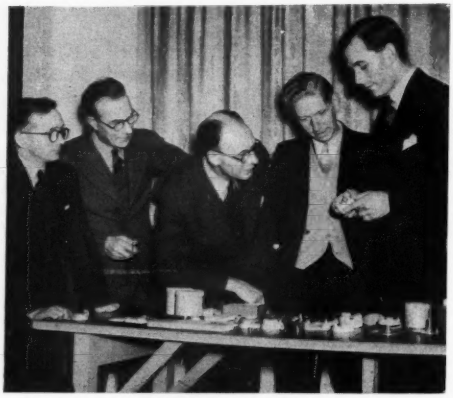
Fig. 3.—Snipe plier with filed circumscribing marks.

NEWS FROM THE BRANCHES

Proposed South-Western Counties Branch.—A successful meeting was held in December, at which one member interested those present with a Partial Denture which he had cast with Virilium, and another demonstrated a full set for which he had used P.M. teeth. The Branch meetings are held at 6 p.m. on the first Tuesday of each month at the Commercial

Hotel, Newton Abbot, and any Laboratory owners in the South-west area wishing to become members are invited to attend.

East of Scotland Branch.—A demonstration meeting was held by arrangement with the S.S.White Company of Great Britain Ltd. at the Film House, 6, Hill St., Edinburgh, on Friday, Dec. 21, 1951. Subjects: "Infra-orbital Anæsthesia", a short colour film. "Virilium",



Mr. J. Boswell pointing out some of the finer details of "Virilium" to attentive listeners.

a practical demonstration by Mr. J. Boswell, F.I.B.S.T. The Branch Dinner was held at the Scotia Hotel, Edinburgh, on Dec. 12, 1951.

West of Scotland Branch also report news of a much appreciated demonstration by Mr. J. Boswell of "Virilium" chrome cobalt alloy.

Birmingham Branch.—The General Meeting was held at the Red Lion Hotel, Church Street, Birmingham, on Dec. 5, 1951.

The Chairman gave a general report on conditions of business and the difficulties through which the trade was now passing, and remarked that since the advent of S.I.M.A. we are now enabled to meet and discuss the various aspects arising. He also noted that our membership was increasing, and invited bona fide Laboratory Owners to join us. He then gave a report on the financial side, gently warning us that we should be incurring additional expense in the future because of the greater activities of the Education Committee, which, headed by Mr. Peter Davies, has achieved considerable success in the past twelve months. The latter, on behalf of the Education Committee, informed the meeting that they had been successful in securing accommodation for future lectures at the College of Technology, Birmingham. This has been due, in no small measure, to the kindness of Mr. Jephson, a member of the staff of that College. The Education Committee has secured the kind offices of Professor Osborne and Mr. J. N. Anderson, for two lectures to be given in February and March. Mr. Jephson has also expressed his willingness to arrange another class at the College, for a further series of lectures in Maxillo-facial Techniques—a course that was well attended and enjoyed by many members last year.

The following members were elected as Officers for the coming year: *Chairman*, Mr. Cross; *Vice Chairman*, Mr. Peter Davies; *Secretary*, Mr. Taylor.

Two new members of the Education Committee were Mr. Gardner, of Coventry, and Mr. Fletcher, of Birmingham.

S.I.M.A. (DENTAL LABORATORIES SECTION) DIARY

South Wales and Monmouthshire Branch (*Secretary*: Mr. R. Mather, F.I.B.S.T., 16, Clodien Avenue, Gabalfa, Cardiff).—Meeting Thursday, March 6, 1952, at the Royal Hotel, Cardiff.

Croydon Branch (*Secretary*: Mr. H. J. Nowers, F.I.B.S.T., 86, Beddington Road, Beddington, Croydon).—Meeting, Friday, Feb. 15, 1952, at The Six Bells, Handcroft Road, Croydon. Lecture by Lt.-Col. Schmidt on "Partial Denture Construction" at 7.30 p.m., on Friday, April 25, 1952, at Norbury Public Library.

Proposed South-western Counties Branch (*Secretary*: Mr. W. H. Horn, 10, Criterion Place, Exmouth, Devon).—Meetings held at the Commercial Hotel, Newton Abbot, first Tuesday of each month.